REMARKS

The Final Office Action dated April 5, 2005, has been received and reviewed.

Claims 23-27, 29-35, 40-51, and 53-64 are currently pending and under consideration in the above-referenced application, each standing rejected.

Reconsideration of the above-referenced application is respectfully requested.

Rejections Under 35 U.S.C. § 102

Claims 23, 24, 29, 30, 33, 40, 45, 46, 49, 50, 53, 59, and 61-64 stand rejected under 35 U.S.C. § 102(e) for reciting subject matter which is purportedly anticipated by that described in U.S. Patent 6,400,007 to Wu et al. (hereinafter "Wu").

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

With respect to inherency, M.P.E.P. § 2112 provides:

> The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish inherency of that result or characteristic. *In re Rijckaert,* 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) . . . 'To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill . . .'' *In re Robertson,* 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1991) (emphasis supplied).

By way of reminder, the Office's attention should be focused on the subject matter recited in the *claims*, not on the subject matter disclosed in the specification of the above-referenced application. Independent claim 23 recites, among other things, "positioning a second semiconductor device at least partially over [a] first semiconductor device, a back side of the second semiconductor device *resting upon at least some . . . discrete conductive elements and being supported thereby . . .*" (emphasis supplied). Independent claim 45 recites, among other things, "positioning a second semiconductor device at least partially over [a] first semiconductor

device and on at least some discrete conductive elements . . . such that *the second semiconductor device is supported by the at least some discrete conductive elements* . . ." Neither independent claim 23 nor independent claim 45 requires that anything other than discrete conductive elements support a second semiconductor device.

The description of Wu, in contrast, is limited to an upper, or second, semiconductor die 34 that is supported by an adhered glue layer 50 or a feature that is identified in the drawings as element "54."

More specifically, Wu describes stacked semiconductor device assemblies, as well as assembly methods. An assembly according to Wu, shown in FIG. 4 thereof, includes a substrate 26. *See also* col. 3, lines 15-18. A first semiconductor die 28 secured to the substrate 26 with glue 30, 50. *See* FIG. 4; col. 3, lines 15-18. A projecting element 52, such as a dam, protrudes from substrate 26 and causes the glue 50 that secures first semiconductor die 28 to substrate 26 to extend upwardly around the outer periphery of the first semiconductor die 28 and to a location beyond the plane in which the active surface 46 of the first semiconductor die 28 is located. Col. 3, lines 18-26.

Wires 32 electrically connect bonding pads 48 of the first semiconductor die 28 to corresponding signal input terminals 40 of the substrate 26. Col. 3, lines 30-32. An element identified in FIGs. 3 and 4 of Wu as "54" is positioned on the active surface 46 of the first semiconductor die 28, between two rows of bonding pads 48. *See also* col. 3, lines 36-40. Element "54" appears to support a second semiconductor die 34, which is positioned over the first semiconductor die 28. *See* FIGs. 3 and 4.

In assembling these components, glue 30 is applied to a surface of the substrate 26, within the confines of the projecting element 52, or dam. Col. 3, lines 18-26. A backside of the first semiconductor die 28 is brought into contact with the glue 30. Col. 3, lines 15-18. As the first semiconductor die 28 is biased toward the substrate 26, the glue 30 oozes upwardly, around the peripheral edges of the first semiconductor die 28, and onto peripheral portions of the active surface 46 thereof to form an adhered glue layer 50. Col. 3, lines 18-26. Next, wires 32 are formed between bonding pads 48 of the first semiconductor die 28 and corresponding signal input terminals 40 of the substrate 26. Col. 3, lines 30-32.

Thereafter, element "54" is placed on the active surface 46 of the first semiconductor die 28. Only after element "54" and adhered glue layer 50 are in place is the second semiconductor die 34 positioned over the first semiconductor die 28 and on element "54." *See* FIGs. 3 and 4.

It has been asserted, at pages 2 and 3 of the Final Office Action, that FIG. 5 of Wu shows wires 32 supporting the second semiconductor die 34. The figures of Wu can only be relied upon for what they reasonable show, based on the specification of Wu. M.P.E.P. § 2125. FIG. 5 of Wu does not clearly depict any of the features located between the first semiconductor die 28 and the second semiconductor die 34. Moreover, the figures of Wu could not be considered to definitively show whether element 54, the adhered glue 50, the wires 32, or some combination thereof supports the second semiconductor die 34.

When viewed in the context of the specification of Wu, it is clear that the second semiconductor die 34 "is stacked above" the first semiconductor die 28 "by adhered glue 50," indicating that the adhered glue 50 supports the second semiconductor die 34. Col. 3, lines 36-40.

As the specification of Wu provides no further detail, and the delicate wires 32 do not necessarily support the second semiconductor die 34, Wu does not expressly or inherently describe that the "a back side of the second semiconductor [die 34] rest[s] upon at least some of the [wires 32]" or that "the second semiconductor [die 34] is supported by . . . at least some discrete conductive elements," as would be required to maintain the 35 U.S.C. § 102(e) anticipation rejections of independent claims 23 and 45, respectively.

Claims 24, 29, 30, 33, and 40 are each allowable, among other reasons, for depending either directly or indirectly from claim 23, which is allowable.

Claim 24 is further allowable because Wu lacks any express or inherent description of positioning a second semiconductor die 34 over wires 32 with a back side of the semiconductor die 34 and wires 32 "in mutual electrical isolation." Instead, the disclosure of Wu is focused on preventing short circuiting between wires 32 and an active surface of the first semiconductor die 28, over which wires 32 extend.

Claim 30 is additionally allowable since Wu does not expressly or inherently describe "drawing" second semiconductor die 34 thereof toward first semiconductor die 28. Instead, the teachings of Wu are limited to "stack[ing]" second semiconductor die 34 above first semiconductor die 28. As evidenced by the disclosures of U.S. Patents 4,891,436 and 6,156,146, copies of which were previously provided to the Office, resins and other adhesive materials do not necessarily shrink when cured. They may instead expand. Furthermore, Wu is silent as to whether adhered glue 50 is in a cured or uncured state when second semiconductor die 34 is positioned over adhered glue 50. As adhered glue 50 does not necessarily shrink when cured and since adhered glue 50 is not necessarily in an uncured state when second semiconductor die 34 is positioned thereover, Wu does not inherently describe each and every element of claim 30.

Claim 33 is also allowable since Wu includes no express or inherent description that a quantity of adhesive material (adhered glue 50 or element 54) is applied to an active surface of first semiconductor die 28 "after . . . positioning the second semiconductor" die 34 thereover. Instead, Wu clearly discloses that adhered glue 50 is applied to first semiconductor die 28 before second semiconductor die 34 is positioned thereover. Col. 3, lines 36-40.

Each of claims 46, 49, 50, 53, 59, and 61-64 is allowable, among other reasons, for depending either directly or indirectly from claim 45, which is allowable.

Claim 50 is additionally allowable since Wu does not expressly or inherently describe "drawing" second semiconductor die 34 thereof toward first semiconductor die 28. Instead, the teachings of Wu are limited to "stack[ing]" second semiconductor die 34 above first semiconductor die 28. As evidenced by the disclosures of U.S. Patents 4,891,436 and 6,156,146, resins and other adhesive materials do not necessarily shrink when cured. They may instead expand. Furthermore, Wu is silent as to whether adhered glue 50 is in a cured or uncured state when second semiconductor die 34 is positioned over adhered glue 50. As adhered glue 50 does not necessarily shrink when cured and since adhered glue 50 is not necessarily in an uncured state when second semiconductor die 34 is positioned thereover, Wu does not inherently describe each and every element of claim 30.

Claim 53 is also allowable since Wu includes no express or inherent description that a quantity of adhesive material (adhered glue 50 or element 54) is applied to an active surface of

first semiconductor die 28 "after . . . positioning the second semiconductor" die 34 thereover. Instead, Wu clearly discloses that adhered glue 50 is applied to first semiconductor die 28 before second semiconductor die 34 is positioned thereover. Col. 3, lines 36-40.

In view of the foregoing, it is respectfully requested that the 35 U.S.C. § 102(e) rejections of claims 23, 24, 29, 30, 33, 40, 45, 46, 49, 50, 53, 59, and 61-64 be withdrawn.

Rejections Under 35 U.S.C. § 103(a)

Claims 25-27, 31, 32, 34, 35, 41-44, 47, 48, 51, 54-58, and 60 stand rejected under 35 U.S.C. § 103(a).

The standard for establishing and maintaining a rejection under 35 U.S.C. § 103(a) is set forth in M.P.E.P. § 706.02(j), which provides:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Wu in View of Lee

Claims 25, 26, 31, 34, 35, 41-44, 47, 51, 54-58, and 60 have been rejected under 35 U.S.C. § 103(a) for reciting subject matter which is purportedly unpatentable over the subject matter taught in Wu, in view of teachings from U.S. Patent 6,388,313 to Lee et al. (hereinafter "Lee").

The teachings of Wu have been summarized above.

Lee teaches a process for forming a multi-chip module. That process includes, among other things, securing a first semiconductor chip 21 to a substrate 20. FIG. 1; col. 5, lines 5-7. Bond pads 210 of first semiconductor chip 21 are electrically connected to corresponding

terminals (not shown) of substrate 20 by bond wires 22. FIG. 1; col. 5, lines 7-10. A so-called "reverse wire-bonding technique" is employed so as to minimize the distance that bond wires 22 protrude above the active surface of first semiconductor chip 21. Col. 5, lines 10-21. Next, an electrically insulative adhesive layer 23 is applied over first semiconductor chip 21. FIG. 1; col. 5, lines 22-25. The adhesive layer 23 completely surrounds bond wires 22 (FIG. 1; col. 5, lines 22-32, 41-49, and 50-59) in such a way as to prevent the bond wires 22 from contacting the nonactive surface of a second semiconductor chip 24 (col. 3, lines 37-42). The second semiconductor chip 24 is then positioned over first semiconductor chip 21 and secured thereto by way of adhesive layer 23. *Id.* Lee teaches that the adhesive layer 23 and the underlying first semiconductor chip 21 support the second semiconductor chip 24. Col. 6, lines 5-13, 25-29.

Claims 25, 26, 31, 34, 35, and 41-44 are each allowable, among other reasons, for depending indirectly from claim 23, which is allowable.

Claim 31 is additionally allowable since Wu and Lee both lack any teaching or suggestion that the adhesive materials or resins disclosed therein are capable of drawing two semiconductor devices toward one another "by at least one of capillary action . . ., curing . . ., application of heat . . . , and vibration." While Wu and Lee both teach use of adhesive layers to secure adjacent elements, neither Wu nor Lee teaches or suggests an adhesive layer that is capable of drawing two elements toward one another.

Claim 34 is further allowable because neither Wu nor Lee teaches or suggests that two semiconductor device may be drawn toward one another.

Claim 35, which depends from claim 34, is also allowable since Wu and Lee do not teach or suggest that curing of a glue, resin, or other adhesive material may cause two semiconductor devices to be drawn toward one another.

Each of claims 47, 51, 54-58, and 60 is allowable, among other reasons, for depending indirectly from claim 45, which is allowable.

Claim 51 is additionally allowable since both Wu and Lee lack any teaching or suggestion that the adhesive materials or resins disclosed therein are capable of drawing two semiconductor devices toward one another "by at least one of capillary action . . ., curing . . ., application of heat . . . , and vibration."

Claim 54 is further allowable because neither Wu nor Lee teaches or suggests that two semiconductor device may be drawn toward one another.

Claim 55, which depends from claim 54, is also allowable since Wu and Lee do not teach or suggest that curing of a glue, resin, or other adhesive material may cause two semiconductor devices to be drawn toward one another.

Claim 57 is additionally allowable because Wu and Lee both lack any teaching or suggestion of controlling biasing of one semiconductor device toward another.

Claim 58 is also allowable since neither Wu nor Lee includes any teaching or suggestion of "controlling biasing force to a level insufficient to deform, kink, bend, or collapse . . . discrete conductive elements." Wu actually teaches away from the subject matter recited in claim 58 by teaching the use of a projecting element 52 and overflow glue 58 to prevent shorting of wires 32 against first semiconductor die 28 as second semiconductor die 34 presses wires 32. Col. 3, lines 50-62.

Claims 25, 26, 31, 34, 35, 41-44, 47, 51, 54-58, and 60 are further allowable because one of ordinary skill in the art would not have been motivated to combine the teachings of Wu and Lee in the manner that has been asserted. In particular, as neither Wu nor Lee teaches or suggests that a back side of an upper semiconductor device may be supported by bond wires or other intermediate conductive elements extending over the active surface of a lower, adjacent semiconductor device. In view of this deficiency, it appears that the only source of motivation to combine the teachings of Wu and Lee in the asserted manner could have been the disclosure of the above- referenced application.

It is further submitted that one of ordinary skill in the art would have had no reason to expect the asserted combination of teachings from Wu and Lee to be successful. Again, as neither of these references teaches or suggests that bond wires may support an upper semiconductor device, there would be no reason for one of ordinary skill in the art to expect that teachings from Wu and Lee could be combined in such a way as to render the subject matter of any of claims 25, 26, 31, 34, 35, 41-44, 47, 51, 54-58, and 60 obvious under 35 U.S.C. § 103(a).

Rather, it appears that the only source of motivation to combine the teachings of Wu and Lee in the manner that has been asserted would have been the hindsight provided by the disclosure of the above-referenced application.

Wu in View of Shim

Claims 27, 32, and 48 are rejected under 35 U.S.C. § 103(a) for being directed to subject matter that is assertedly unpatentable over the teachings of Wu, in view of teachings from U.S. Patent 6,531,784 to Shim et al. (hereinafter "Shim").

Claims 27 and 32 are both allowable, among other reasons, for depending indirectly from claim 23, which is allowable.

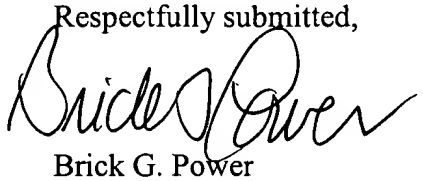
Claim 48 is allowable, among other reasons, for depending indirectly from claim 45, which is allowable.

In view of the foregoing, withdrawal of the 35 U.S.C. § 103(a) rejections of claims 25-27, 31, 32, 34, 35, 41-44, 47, 48, 51, 54-58, and 60 is respectfully requested.

CONCLUSION

It is respectfully submitted that each of claims 23-27 and 29-64 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



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